

WHAT IS CLAIMED IS:

1. An apparatus for forwarding packets, comprising:

a plurality of inputs configured to receive respective incoming streams of data packets;

a plurality of outputs configured to transmit respective outgoing streams of data packets;

packet forwarding logic configured to form outgoing streams of data packets from the

5 data packets contained in the incoming streams; and

redundancy logic configured to transmit a first outgoing stream of data packets formed by the packet forwarding logic to a first output and a second output and further configured to discard data packets contained in a selected incoming stream from one of a first input and a second input before the data packets contained in the selected incoming stream are included in any outgoing data streams.

2. The apparatus of claim 1, wherein the first input and the first output are configured to couple to a first service module for processing data packets contained in the first outgoing stream.

3. The apparatus of claim 2, wherein the second input and the second output are configured to couple to a second service module for processing data packets contained in the first outgoing stream.

4. The apparatus of claim 3, wherein each of the first and second service modules maintains a respective state based upon data packets contained in the first outgoing stream.

5. The apparatus of claim 3, wherein the redundancy logic designates one of the first service module and the second service module to be primary and the other to be secondary and discards data packets contained in the incoming stream from the one of the first and second service modules that is secondary.
6. The apparatus of claim 5, wherein the first service module is initially designated to be primary.
7. The apparatus of claim 6, wherein, upon receiving an indication that the first service module has failed, the control logic designates the second service module to be primary and the first service module to be secondary.
8. The apparatus of claim 1, wherein the packet forwarding logic uses destination address information contained in the data packets of the incoming streams to form the outgoing streams.
9. The apparatus of claim 1, wherein the redundancy logic comprises multicast logic for duplicating specified data packets for output to a plurality of outputs.

10. A method of forwarding data packets, comprising:  
forming a first data stream from received data packets;  
transmitting the first data stream to both a first service module and a second service module;

5 receiving an indication of whether the first service module has failed;  
if the indication indicates that the first service module has not failed, discarding packets processed by the second service module;  
if the indication indicates that the first service module has failed, discarding packets processed by the first service module.

11. The method of claim 10, further comprising:  
in each of the first and second service modules, maintaining a respective state based upon the transmitted first data stream.

12. The method of claim 10, further comprising:  
initially designating the first service module to be active, and  
designating the second service module to be active if the indication indicates that the first service module has failed.

13. The method of claim 10, further comprising:  
if the indication indicates that the first service module has not failed, forming outgoing streams from at least data packets processed by the first service module.

14. The method of claim 13, further comprising:

if the indication indicates that the first service module has failed, forming outgoing streams from at least data packets processed by the second service module.

15. A controller, comprising:

packet forwarding logic configured to forward a stream of data packets to first and second service modules;

selection logic configured to select one of the first and second service modules based on a status signal indicating whether the first service module has failed;

discard logic configured to discard data packets processed by the first service module if the status signal indicates that the first service module has failed and to discard data packets processed by the second service module if the status signal indicates that the first service module has not failed.

16. An interface module usable in a system for forwarding packets, comprising:

an ingress port for receiving an incoming stream of data packets;

a transfer unit configured to transmit the data packets contained in the received incoming stream to each of a plurality of forwarding planes connectable to the interface module;

an egress port for transmitting an outgoing stream of data packets;

a switchover unit configured to select one of the plurality of forwarding planes connectable to the interface module and to form the outgoing stream of data packets from data packets received from the selected forwarding plane.

17. The interface module of claim 16, wherein the switchover unit selects one of the plurality of forwarding planes in response to receipt of a signal indicating the status of one or more of the plurality of forwarding planes.

18. A system for forwarding packets, comprising:

first and second forwarding planes, each configured to receive data packets from a plurality of interface modules and transmit received data packets to a plurality of interface modules;

5 a first interface module coupled to the first and second forwarding planes, the first interface module receiving data packets contained in an incoming stream at an ingress port and transmitting the data packets to the first forwarding plane and the second forwarding plane, the first interface module further receiving data packets from each of the first and second forwarding planes and transmitting at an egress port data packets from a selected one of the first and second forwarding planes.  
10

19. The system of claim 18, further comprising:

a routing engine, coupled to each of the first and second forwarding planes, for computing route information using routing protocols.

20. The system of claim 19, wherein each of the first and second forwarding planes forwards received data packets for transmission based on address information contained in respective data packets and route information computed by the routing engine.

21. The system of claim 18, wherein the first interface module selects one of the first and second forwarding plans in response to a signal indicating the status of one or more of the forwarding planes.